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Solution by J. F. W. SCHEFFER, A. M, Hagerstown, Maryland.

Denoting the arc by 2θ, and the height by h, we have for the area of the segment $r^2\theta-r^2\sin\theta\cos\theta=r^2\theta-\frac{1}{2}r^2\sin2\theta$.

$\therefore\quad 2\theta-\sin2\theta=\frac{2c}{r^2}$, which transcendental equation is to be solved to find θ, then h is found by the relation, $h=2r\sin^2\frac{1}{2}\theta$.

We might express the area also by r and h directly, and we would then have the transcendental equation $\cos^{-1}\frac{r-h}{r}-(r-h)\sqrt{(2rh-h^2)}=\frac{c}{r^2}$; which, however, is too inconvenient for solution.

Also solved by *A. H. Bell, J. A. Calderhead, and C. D. Schmitt.*

38. Proposed by F. M. SHIELDS, Coopwood, Mississippi.

A man sold 2 horses and a mule for \$286.90. On the first horse he gained as much per cent. as the horse cost dollars, and gained $\frac{5}{8}$ as much per cent. on the second horse as the first, and he looses \$9.10 on the mule. His net gain was \$86.90. What was the cost and selling price of each?

Solution by T. W. PALMER, M. A., Professor of Mathematics, University of Alabama.

Let x=cost of 1st horse, y=cost of 2nd horse, and z=cost of mule. Then $x+y+z=\$286.90-\$86.90=\$200\ldots.(1)$.

$$\frac{x^2}{100}+\frac{5xy}{800}=\$86.90+\$9.10=\$96\ldots.(2).$$

$$\therefore\quad 8x^2+5xy=76800,\text{ or } y=\frac{8(9600-x^2)}{5x}\ldots.(3).$$

And substituting this in (1), we obtain $z=\frac{3x^2+1000x-76800}{5x}$.

From these two indeterminate equations, we find $x<97$ and $x>65$, and $z>9.10$. An indefinite number of solutions is possible. But in (3), $x=80$ satisfies all the conditions. When $x=80$, $y=64$, and $z=56$.

Also $x+\frac{x^2}{100}=144$, $y+\frac{5xy}{800}=96$, and $z-9.10=46.90$.

$$\therefore\quad \left.\begin{array}{r} x=\$80\\ y=\$64\\ z=\$56\end{array}\right\}=\text{cost};$$

$$\left.\begin{array}{l} x+\frac{x^2}{100}=\$144\\ y+\frac{5xy}{800}=\$\ 96\\ z-9.10=\$\ 46.90\end{array}\right\}=\text{selling price.}$$

Also solved by *J. A. Calderhead, J. Scheffer, C. D. Schmitt, and G. B. M. Zerr.*

A solution of number 35 was received from *Prof. Cooper D. Schmitt*, after last issue of **Monthly** had gone to press.